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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,303	02/24/2004	Shinji Yamaguchi	118837	2271

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EXAMINER	
MERKLING, MATTHEW J	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
03/25/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/784,303	YAMAGUCHI, SHINJI	
	Examiner	Art Unit	
	MATTHEW J. MERKLING	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2/21/08 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoj et al. (WO 00/01463) in view of Muramatsu et al. (US 5,384,110).

Regarding claim 1, Hoj discloses a catalyst-carried filter (Fig. 7) comprising:

a honeycomb structure (abstract) including a plurality of cells which are partitioned by partition walls (filter walls, page 17 lines 11-13) constituted of a porous ceramic (See claim 14 of Hoj) including a large number of pores to constitute a channel of a gas (page 17 lines 11-13); and

an oxidation catalyst which is carried on the surfaces of the partition walls and inner walls of the pores existing in the partition walls to promote oxidation of particulates contained in an exhaust gas (page 4, lines 9-13, page 3, lines 3-5), the plurality of cells including one opening end and the other opening end which are alternately clogged (page 17 lines 11-13),

wherein the plurality of cells include exhaust gas inflow cells whose one opening end is clogged (page 17 lines 11-13) and in which the oxidation catalyst is carried on the surfaces of the partition walls (page 3, lines 3-5), and purified gas outflow cells whose other opening end is clogged (page 17 lines 11-13), the exhaust gas inflow cells and the purified gas outflow cells are alternately arranged (page 17 lines 11-13), and at least one fine coating layer (membrane) constituted of a porous ceramic (see claim 48 of Hoj) having an average pore diameter smaller than that of the porous ceramic constituting the partition wall (see abstract) is formed on the surface of the partition wall on the side of the purified gas outflow cell (see abstract, Fig. 5 (20)), furthermore, Hoj, in claim 43, describes a method of making a catalyst carried filter where the oxidation catalyst is applied to the filter body (partition walls) before the membrane is coated on the filter. As such, the membrane's surface is free of catalyst. Furthermore, Hoj teaches an apparatus for filtering soot particles and oxidizing the trapped soot particles. Hoj does this by:

1) coating an oxidation catalyst on, and in the partition wall of a honeycomb filter,

2) allowing the soot particles enter the larger diameter pores of the filter body (honeycomb filtering walls) on the inlet side,

3) keeping the soot particles in contact with the oxidation catalyst by applying a smaller pore diameter layer on the outlet side of the filter body in order to provide a slight resistance for the soot particles to pass (see abstract of Hoj for this summary).

As discussed above, Hoj teaches a soot filter body with a large pore diameter inlet side, with a small pore diameter outlet side, in order to maximize the contact between the soot particles, which enter the large pore diameter filter, and the oxidation catalyst. Hoj further discloses the porosity of the partition wall (filter wall) is preferably 40-75% (see claim 32 of Hoj). However, Hoj fails to teach the porosities of the fine coating layer (membrane) on the outlet side of the filter as 45-85%.

Muramatsu also discloses an exhaust gas filter which operates very much the same way as the filter of Hoj. Muramatsu also discloses a larger-pore size filter body which is located on the inlet side, as well as a thin layer of a smaller pore-diameter located on the outlet side of the filter. Muramatsu uses this configuration for the same reason as that of Hoj, in that the larger pore diameter inlet side allows particles to enter the pores, and the smaller pore diameter outlet side retains these particles inside the filter for a longer time period with which to react with the catalyst particles (see col. 7 lines 9-46 for this summary).

Muramatsu teaches that the porosity of a thin layer (high density thin layer) on the outlet of the catalyst carried filter is preferably from 40-70% (col. 7 lines 39-

46). Muramatsu teaches these ranges in order to allow the exhaust gas to easily enter into the pores of the partition walls (low density) and partially restrict the flow with the fine coating layer (high density) to allow for efficient removal of NOx by the catalyst in the partition wall (low density) (col. 7 lines 16-23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the porosity ranges of Muramatsu for the fine coating layer in the catalyst carried filter of Hoj in order to allow the exhaust gas to easily enter into the pores of the partition walls (low density) and partially restrict the flow with the fine coating layer (high density) to allow for efficient removal of NOx by the catalyst in the partition wall (low density).

Regarding claim 2, Hoj, as discussed in claim 1 above, further discloses the pore diameter of the ceramic constituting the partition wall is preferably 40-80 μm (see claim 31 of Hoj) and the average pore diameter of the fine coating layer (membrane) is 5-10 μm (page 23 lines 31-32).

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoj et al. (WO 00/01463) and Muramatsu et al. (US 5,384,110) as applied to claim 1 above, and further in view of Loncke (EP 1018357 A1).

Regarding claim 4, modified Hoj, as discussed in claim 1, discloses all of the claim limitations, but fails to teach the porosity of the partition wall (inlet side) is smaller than the fine coating layer (outlet side) by 5% or more.

Loncke also discloses a filter with two layers of differing porosities.

Loncke teaches the inlet side of the filter has a layer that exhibits a porosity of at least 20% more than the porosity of the second layer (outlet side) (paragraph 6) in order to limit the amount of pressure drop over the second layer and improving the pressure drop of the filter as a whole (paragraph 4 and 9).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a greater porosity on the inlet side of the filter than on the outlet side of the filter, as in Loncke, in the catalyst carried filter of Hoj in order to limit the amount of pressure drop over the second layer and improving the pressure drop of the filter as a whole.

Response to Arguments

5. Applicant's arguments filed 8/1/01 have been fully considered but they are not persuasive.

On page 5, second paragraph, Applicant argues that "the method disclosed by Miramatsu cannot retain the original porosity of the so-called "honeycomb structure" before coating the high-density, thin-layer portion with a second catalyst". As best understood, Applicant is arguing that the method of producing the thin-layer of Miramatsu (which, in the example given is layered on an outlet surface of a foam-type porous body, as opposed to a honeycomb structure) cannot be used for a honeycomb structure. The examiner finds this argument a moot point, as Hoj was not modified by Miramatsu for the purposes of depositing a layer of material on a filter body. Hoj teaches the method of which the thin membrane layer is coated on a honeycomb style filter. The membrane layer of Hoj inherently contains a porosity, but Hoj does not

discloses precisely what this porosity is. Miramatsu teaches the preferred porosity of a thin layer on the outlet side, which is utilized for the same purpose as the membrane layer of Hoj. Hoj was modified with the porosity of the outlet layer defined by Miramatsu, not the method of depositing the layer on the filter body.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 1795

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795